



清华经管学院
Tsinghua SEM



Center for Internet
Development and Governance
互联网发展与治理研究中心

LinkedIn 领英

全球数字人才发展年度报告

Global Digital Talent Development Report

(2020)



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前言

数字经济在全球经济增长中扮演着越来越重要的角色，以大数据、人工智能为代表的数字技术与传统产业的深度融合释放出巨大能量，成为引领经济发展的新动力。伴随着数字化转型的深入推进，各行各业对数字技能人才的需求正在急剧增长，人才短缺已经成为影响数字经济发展的关键因素。2017 年以来，清华大学经济管理学院互联网发展与治理研究中心（CIDG）与全球职场社交平台领英（LinkedIn）经济图谱团队合作，提出“数字人才”这一概念，并基于领英数据从全球视野分析和追踪数字人才的发展现状与趋势。数字人才为我们研究全球经济的数字化转型提供了一个独特的视角，2020 年我们对来自全球 31 个重要创新城市（地区）近 4000 万数字人才（领英人才数据截止到 2019 年 12 月 31 日）进行分析洞察，从人才的行业分布、技能特征、流动情况等角度对全球数字人才发展现状以及数字经济的发展趋势进行深入分析。希望我们的研究能够帮助不同国家和城市更好地了解自身的人才优劣势及全球人才趋势，对未来如何发展数字经济带来参考和启发。

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10/2020

The digital economy plays an increasingly important role in global economic growth. The deep integration of digital technology such as big data and AI into traditional industries is a new driving force for economic development. Rapid digital transformation has triggered fast-growing demand for digital talents from all backgrounds, but a shortage of digital talent limits the development of the digital economy. Since 2017, the Tsinghua SEM Center for Internet Development and Governance (CIDG) and the LinkedIn Economic Graph have collaborated to study "digital talent." We track and analyze the development status and trends of digital talents from a global perspective, based on LinkedIn data. Digital talent provides a unique perspective for us to study the digital transformation of the global economy. In this report, we studied the data through December 31, 2019 to gain insight into nearly 40 million digital talents from 31 world's leading innovative cities. Our study presents the development status of global digital talents and the development trend of the digital economy from an in-depth analysis of industry distribution, skill characteristics and migration of talents. Our goal is to assist diverse countries and cities worldwide to better understand their own strengths and weaknesses of talent, the global talent trends, and to bring reference and inspiration to how to develop the digital economy in the future.



01 数字人才分布

1. 本研究从 ICT 行业（包括软件与 IT 服务和计算机网络与硬件）和非 ICT 行业（制造、金融、消费品等 22 个传统行业）的角度分析数字人才的行业分布特征，从研究的 31 个城市（地区）整体来看，数字人才在非 ICT 行业的比例更高。其中，洛杉矶、纽约、香港、阿联酋、伦敦非 ICT 行业数字人才占比位居前五，且均超过 80%。班加罗尔、杭州、北京、旧金山湾区、南京、深圳、都柏林 ICT 行业数字人才占比位居前列，且均超过 30%。

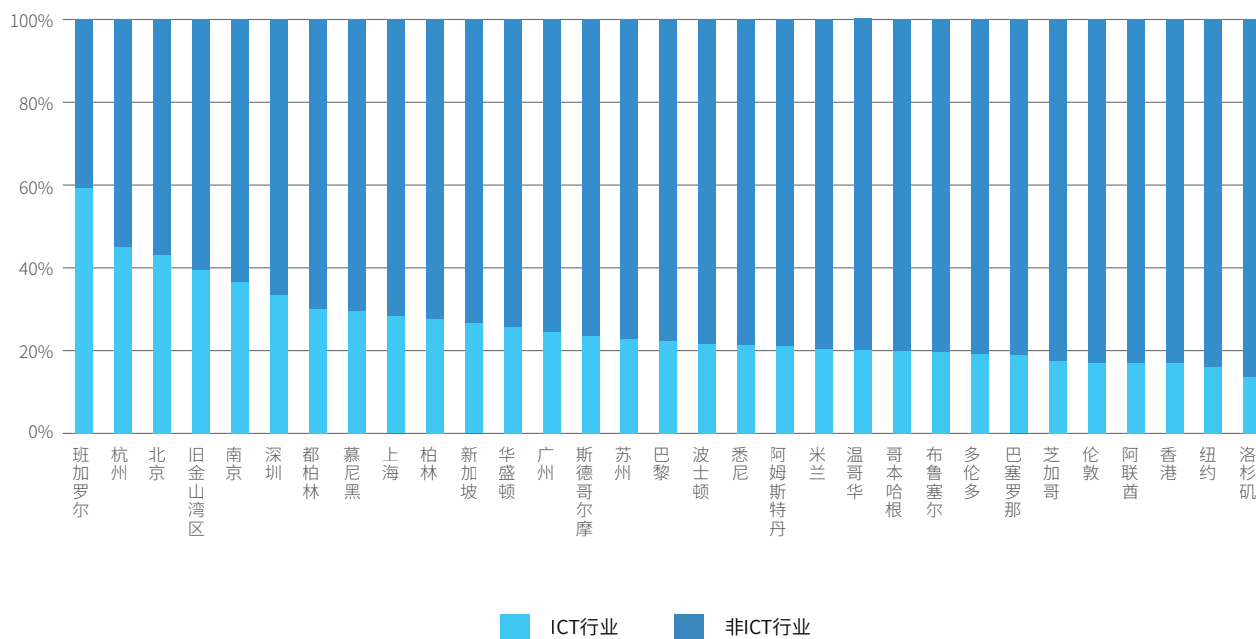


图 1 城市 (地区) 数字人才行业分布





01 The Distribution of Digital Talents

1. This study makes a deep analysis into the distribution of digital talent in both the ICT industries (including software and IT services and networking and hardware) and non-ICT industries (22 traditional industries such as manufacturing, finance, consumer goods, etc.).

- The overall proportion of digital talent in non-ICT industries is higher than that in ICT industries from 31 cities studied, inferring that digital talents have been increasingly penetrating into the non-ICT industries.
- Among them, Los Angeles, New York, Hong Kong, The UAE and London are ranked the top five regarding the proportion of digital talent in non-ICT industries, all exceeding 80%.
- The proportion of digital talent in ICT industries is highest in Bangalore, Hangzhou, Beijing, San Francisco, Nanjing, Shenzhen and Dublin, all exceeding 30%.

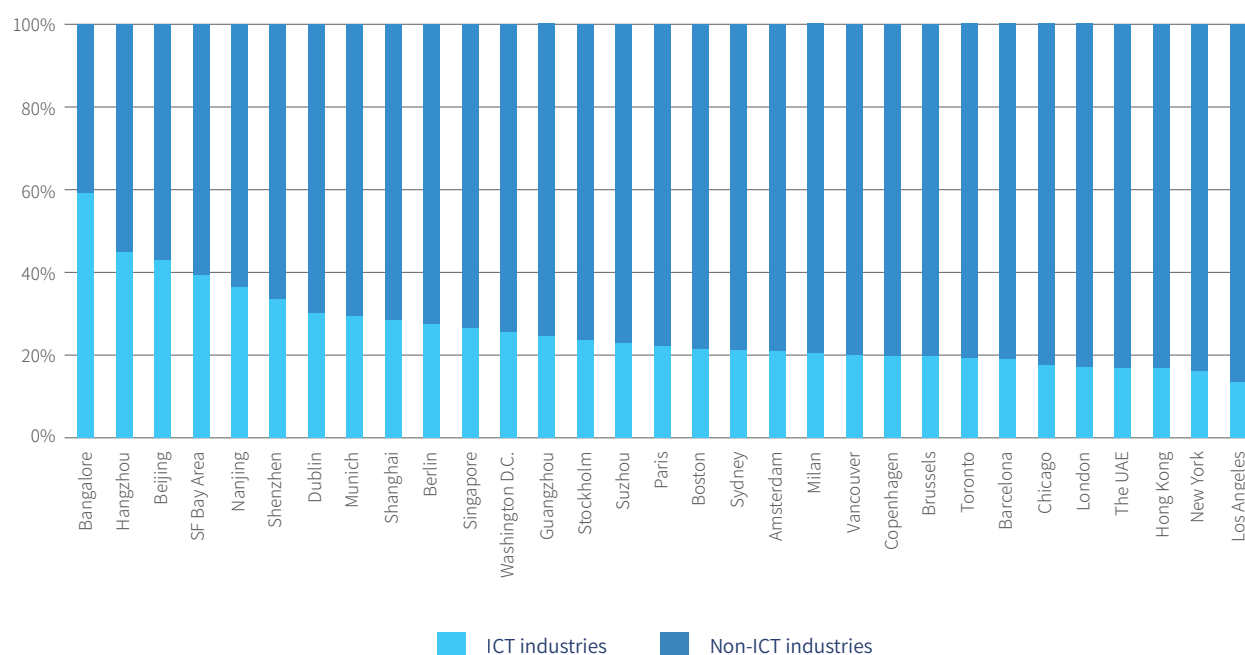


Figure 1 The Distribution of Digital Talents in Different Cities

2. 在全球主要的创新型城市中，非 ICT 行业的数字人才在制造、金融、消费品、公司服务四大行业相对集中。制造业数字人才占比最高的五大城市包括：苏州、慕尼黑、上海、深圳、南京；金融业数字人才占比最高的五大城市包括：香港、伦敦、多伦多、纽约、新加坡；消费品行业数字人才占比最高的五大城市包括：深圳、广州、米兰、香港、巴塞罗那；公司服务业数字人才占比最高的五大城市包括：伦敦、华盛顿、阿姆斯特丹、米兰、布鲁塞尔。制造和消费品行业数字人才占比亚太和欧洲相对领先，公司服务业数字人才占比欧洲相对领先，金融业数字人才占比全球各区域比较均衡。

 软件与IT服务	 计算机网络与硬件	 制造
班加罗尔 杭州 北京 旧金山湾区 都柏林 柏林 南京 慕尼黑 华盛顿 上海	深圳 南京 苏州 旧金山湾区 杭州 上海 班加罗尔 北京 慕尼黑 新加坡	苏州 慕尼黑 上海 深圳 南京 巴塞罗那 广州 米兰 杭州 巴黎
 金融	 消费品	 公司服务
香港 伦敦 多伦多 纽约 新加坡 悉尼 斯德哥尔摩 芝加哥 布鲁塞尔 巴黎	深圳 广州 米兰 香港 巴塞罗那 洛杉矶 旧金山湾区 纽约 上海 苏州	伦敦 华盛顿 阿姆斯特丹 米兰 布鲁塞尔 阿联酋 巴黎 巴塞罗那 斯德哥尔摩 都柏林

表 1 代表性行业的城市 (地区) 排名 (Top10)

2. Among the non-ICT industries, digital talents are mainly concentrated in manufacturing, finance, consumer goods and corporate services.

- In the manufacturing industry, the top five cities with the highest proportion of digital talent are Suzhou, Munich, Shanghai, Shenzhen and Nanjing;
- In the finance industry, the top five cities with the highest proportion of digital talent are Hong Kong, London, Toronto, New York and Singapore;
- In the consumer goods, the top five cities with the highest proportion of digital talent industry are Shenzhen, Guangzhou, Milan, Hong Kong and Barcelona;
- In the corporate services industry, the top five cities with the highest proportion of talent are London, Washington, Amsterdam, Milan and Brussel.

The proportion of digital talents in the manufacturing and consumer goods industries is relatively leading in Asia-Pacific and Europe, the proportion of digital talents in the corporate services industry is relatively leading in Europe, and the proportion of digital talents in the financial industry is relatively balanced across the world.



Software & IT Services

Bangalore
Hangzhou
Beijing
San Francisco Bay Area
Dublin
Berlin
Nanjing
Munich
Washington D.C.
Shanghai



Hardware & Networking

Shenzhen
Nanjing
Suzhou
San Francisco Bay Area
Hangzhou
Shanghai
Bangalore
Beijing
Munich
Singapore



Manufacturing

Suzhou
Munich
Shanghai
Shenzhen
Nanjing
Barcelona
Guangzhou
Milan
Hangzhou
Paris



Finance

Hong Kong
London
Toronto
New York
Singapore
Sydney
Stockholm
Chicago
Brussels
Paris



Consumer Goods

Shenzhen
Guangzhou
Milan
Hong Kong
Barcelona
Los Angeles
San Francisco Bay Area
New York
Shanghai
Suzhou



Company Services

London
Washington D.C.
Amsterdam
Milan
Brussels
The UAE
Paris
Barcelona
Stockholm
Dublin

Table 1 Ranking of cities (regions) in representative industries (Top 10)



02 数字技能分析

3. 在全球主要的创新城市(地区)中,数字技能正表现出越来越高的代表性,但不同地区差异较大。中国大陆和印度创新城市代表性技能以数字技能为主;欧洲和亚太其他创新城市代表性技能既包括丰富的数字技能,也包括丰富的行业技能;北美地区代表性技能以行业技能为主。



图 2.1 亚太地区各城市(地区)代表性技能 TOP 5



02 The Analysis of Digital Skills

3. Digital skills are more prevalent in the world's leading innovative cities, but there are significant differences among different cities. The representative skills of innovative cities in mainland China and India are mainly digital skills; the representative skills of Europe cities and other innovative cities in Asia Pacific are more balanced between digital skills and industrial (traditional) skills; the representative skills in North America are mainly industrial (traditional) skills.

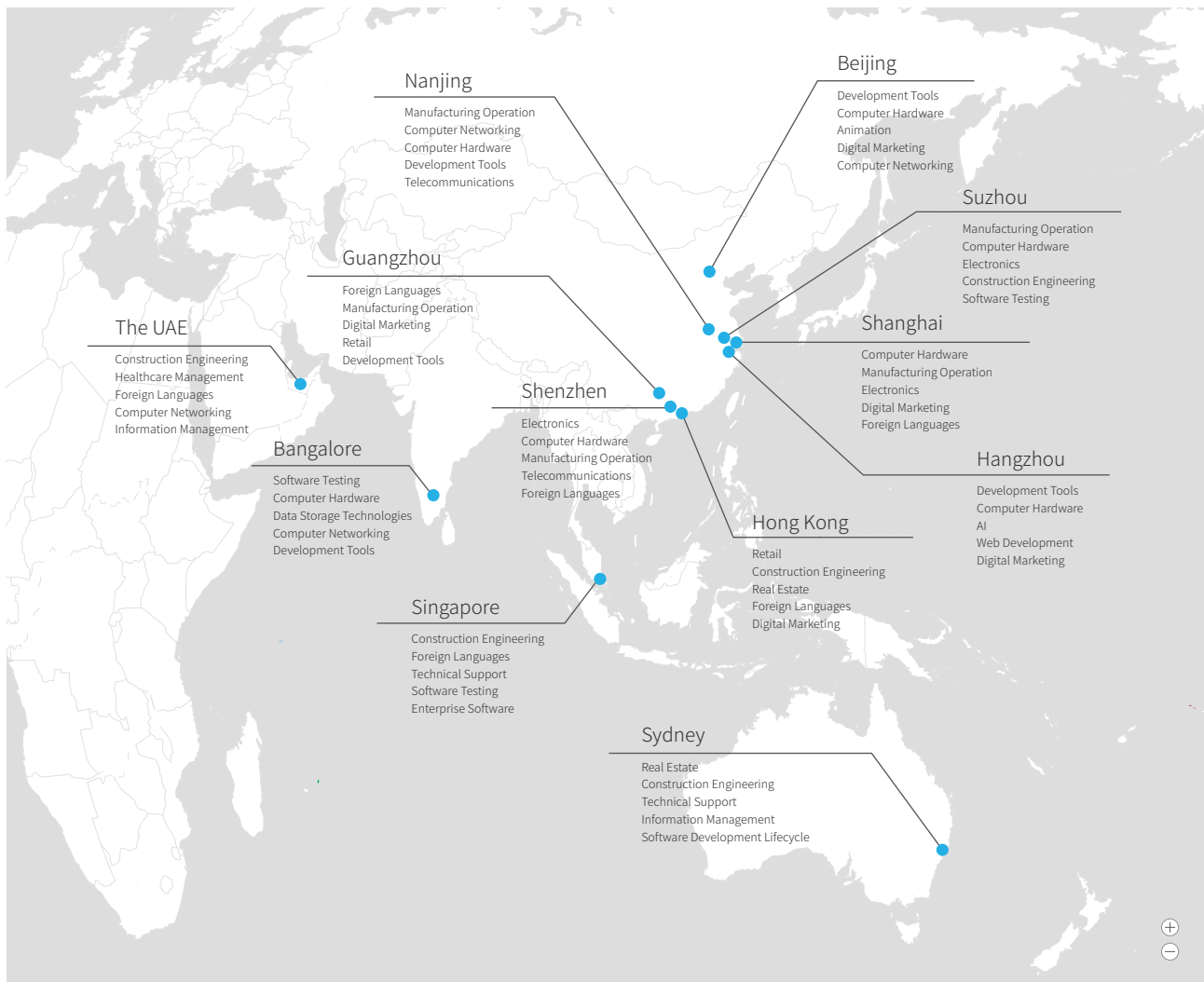


Figure 2.1 The top five representative skills in the Asia-Pacific cities (region)



图 2.2 北美地区各城市代表性技能 TOP 5

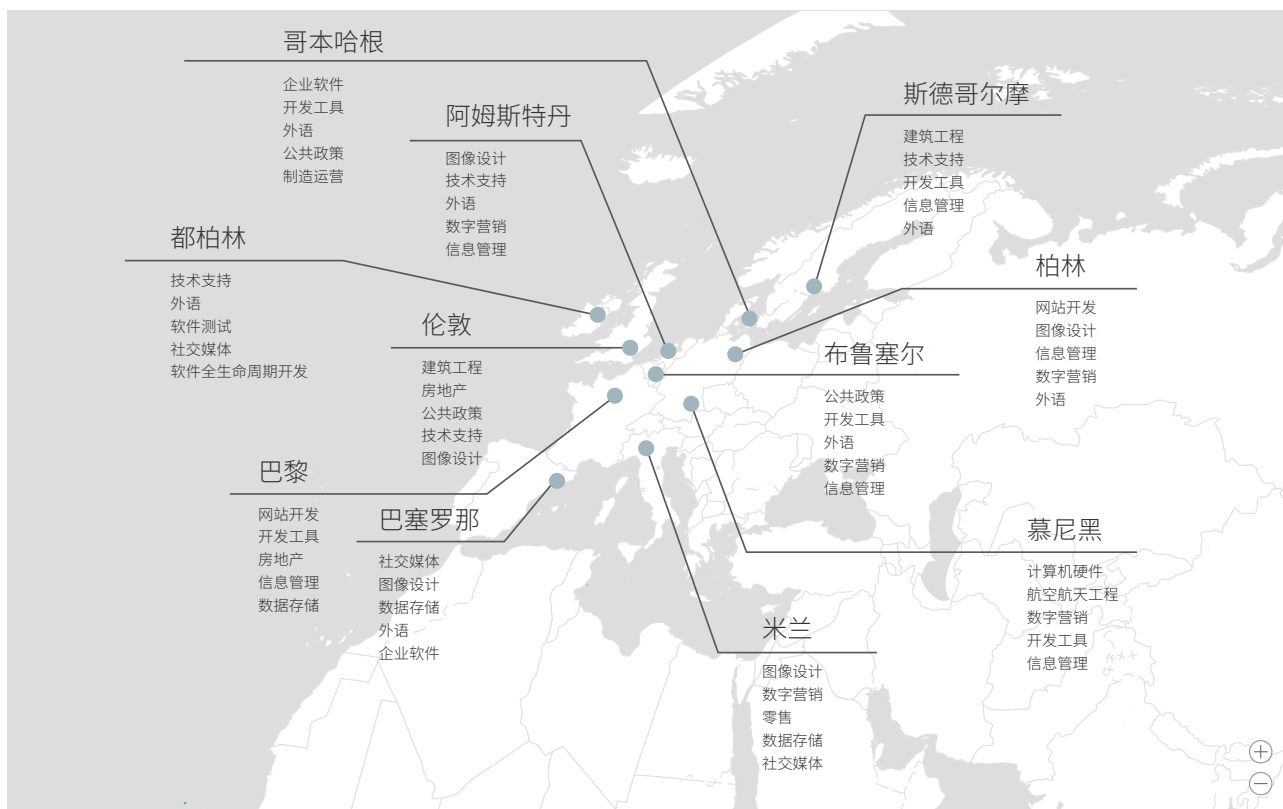


图 2.3 欧洲地区各城市代表性技能 TOP 5

(注：此处为全技能排名，既包括数字技能，也包括其他技能)

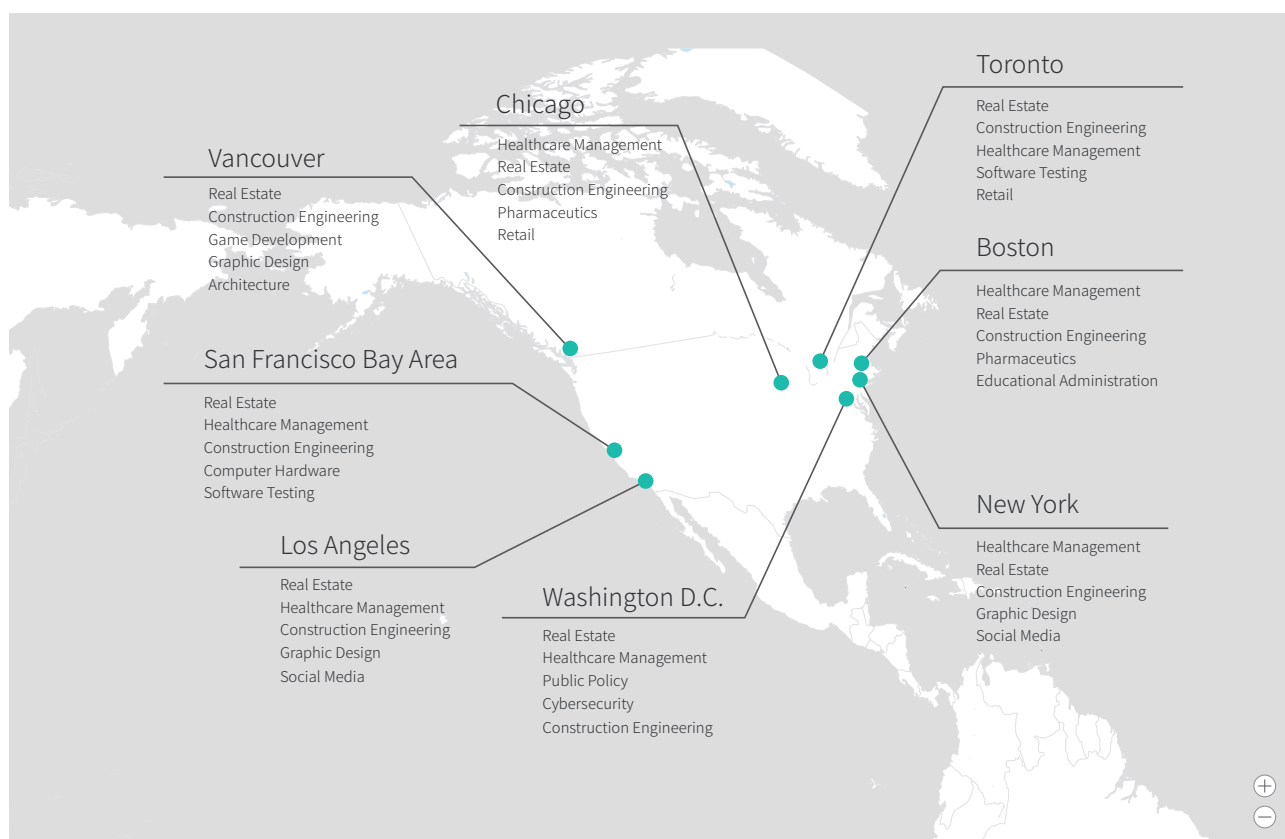


Figure 2.2 The top five representative skills in the North America cities

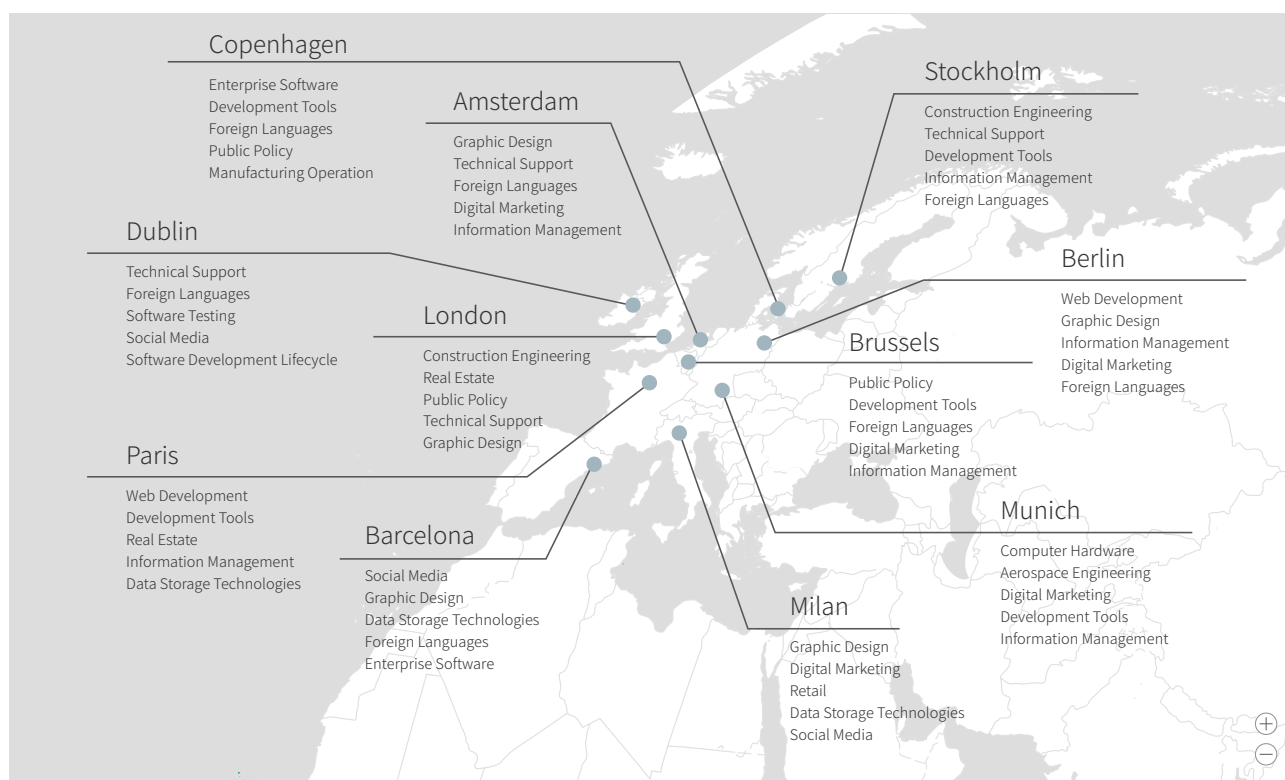


Figure 2.3 The top five representative skills in the European cities.

(Note: It is the ranking of all skills, including both digital skills and other skills.)

4. 颠覆性数字技能是推动数字化深层次转型的核心力量，旧金山湾区、班加罗尔颠覆性技能的渗透率最高，在材料科学、人工智能等多个领域均处于全球引领地位。阿联酋、新加坡、上海、巴黎、慕尼黑、伦敦、纽约、波士顿、柏林、巴塞罗那等处于第二梯队，在单个（或少数几个）颠覆性技能领域具有突出的人才优势，例如新加坡的材料科学、机器人、基因工程，上海的材料科学、纳米技术和机器人，巴黎的材料科学和航空航天工程等技能具有较强的人才优势。

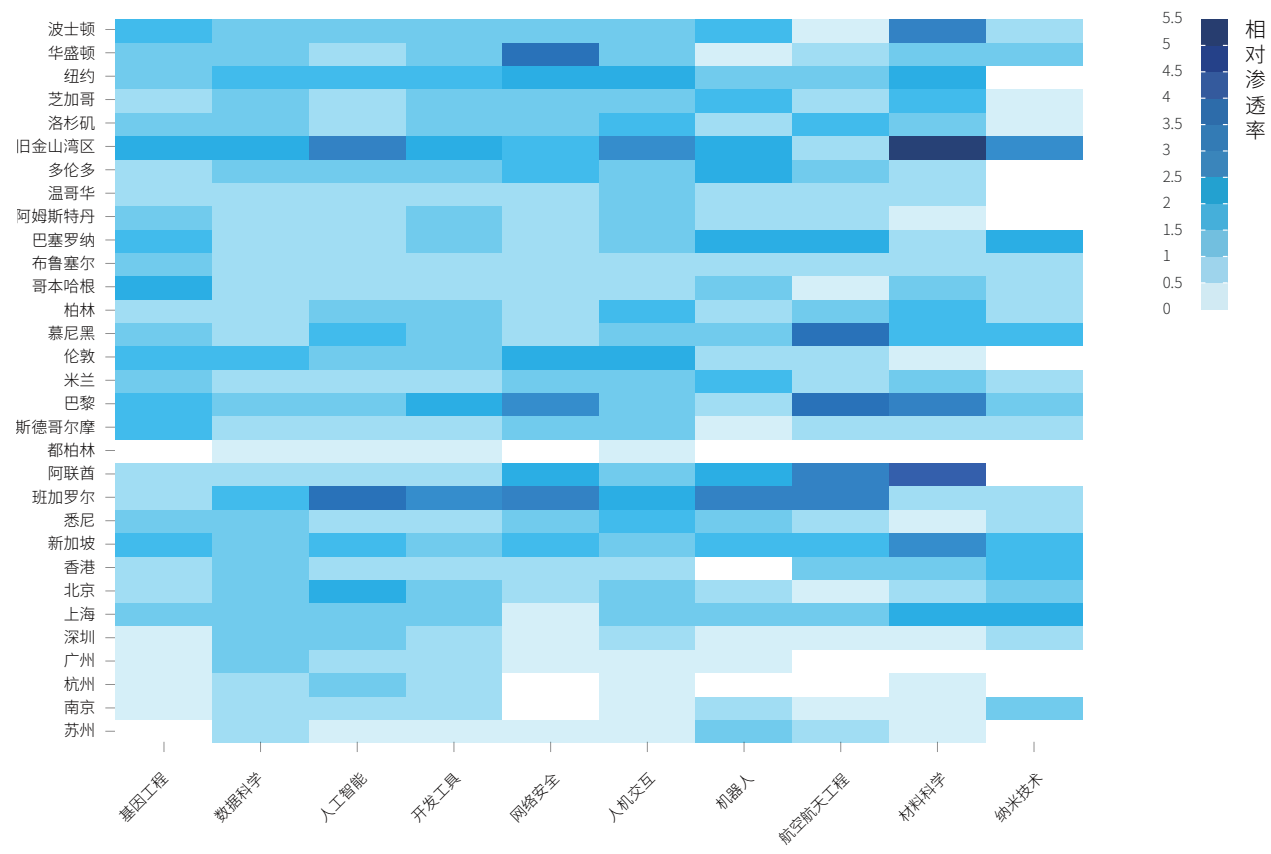


图3 各城市（地区）颠覆性技能渗透率
(注：空白方格表示数据缺失)

5. 北美、欧洲和亚太地区颠覆性数字技能呈现差异化发展趋势。北美地区城市颠覆性技能的渗透率较高，且处于全球引领地位；欧洲地区整体排名都比较靠前，其中德国慕尼黑在航空航天、法国巴黎在航空航天和材料科学均具备领先优势；亚太地区印度班加罗尔、阿联酋、新加坡排名较高，而中国城市在颠覆性技能渗透率上的排名相对落后。



4. Disruptive digital skills (e.g. AI, data science, robotics, etc.) are core to drive deeper digital transformation.

- The SF Bay Area and Bangalore are global leaders with the highest penetration rate of disruptive skills in many fields such as material science and AI.
- The UAE, Singapore, Shanghai, Paris, Munich, London, New York, Boston, Berlin and Barcelona are in the second tier, each with obvious talent advantages with at least one or more disruptive skills.
- For example, Singapore has a stronger representation in materials science, robotics and genetic engineering fields; in Shanghai it is in the materials science, nanotechnology and robotics sectors; in Paris it is in the materials science and aerospace engineering fields.

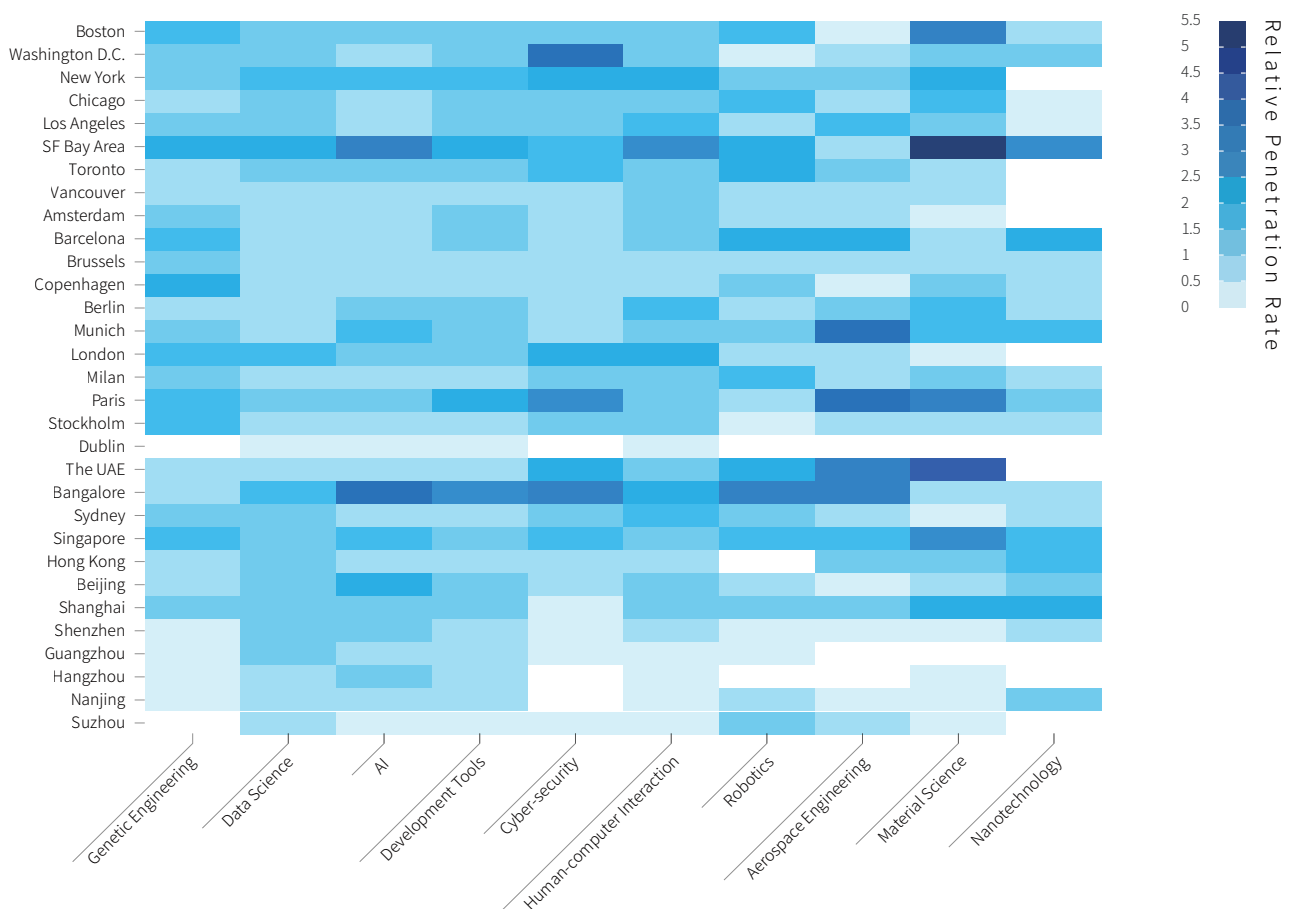


Figure 3 The penetration rate of disruptive skills of cities (regions)

(Note: Blank squares indicate the missing data)

5. Disruptive digital skills in North America, Europe and the Asia-Pacific Region show differentiated development.

- North America leads the world in the penetration rate of disruptive skills;
- Europe's overall ranking is also high on the list, with Munich, Germany taking the lead in aerospace and in Paris, France it is aerospace and material science;
- In the Asia-Pacific Region, Bangalore, The UAE and Singapore rank higher, and Chinese cities still lag behind most North American and European cities.



03 数字人才流动 (2019 年)

6. 从全球数字人才吸引力来看，欧洲城市和亚太城市居于前列。吸引力前五的城市依次是都柏林、柏林、新加坡、深圳、米兰，而北京、南京、广州、芝加哥、波士顿五个城市处于净流出状态。从数字人才流动量来看，班加罗尔、阿联酋、新加坡、旧金山湾区、纽约是全球数字人才流动中心枢纽。

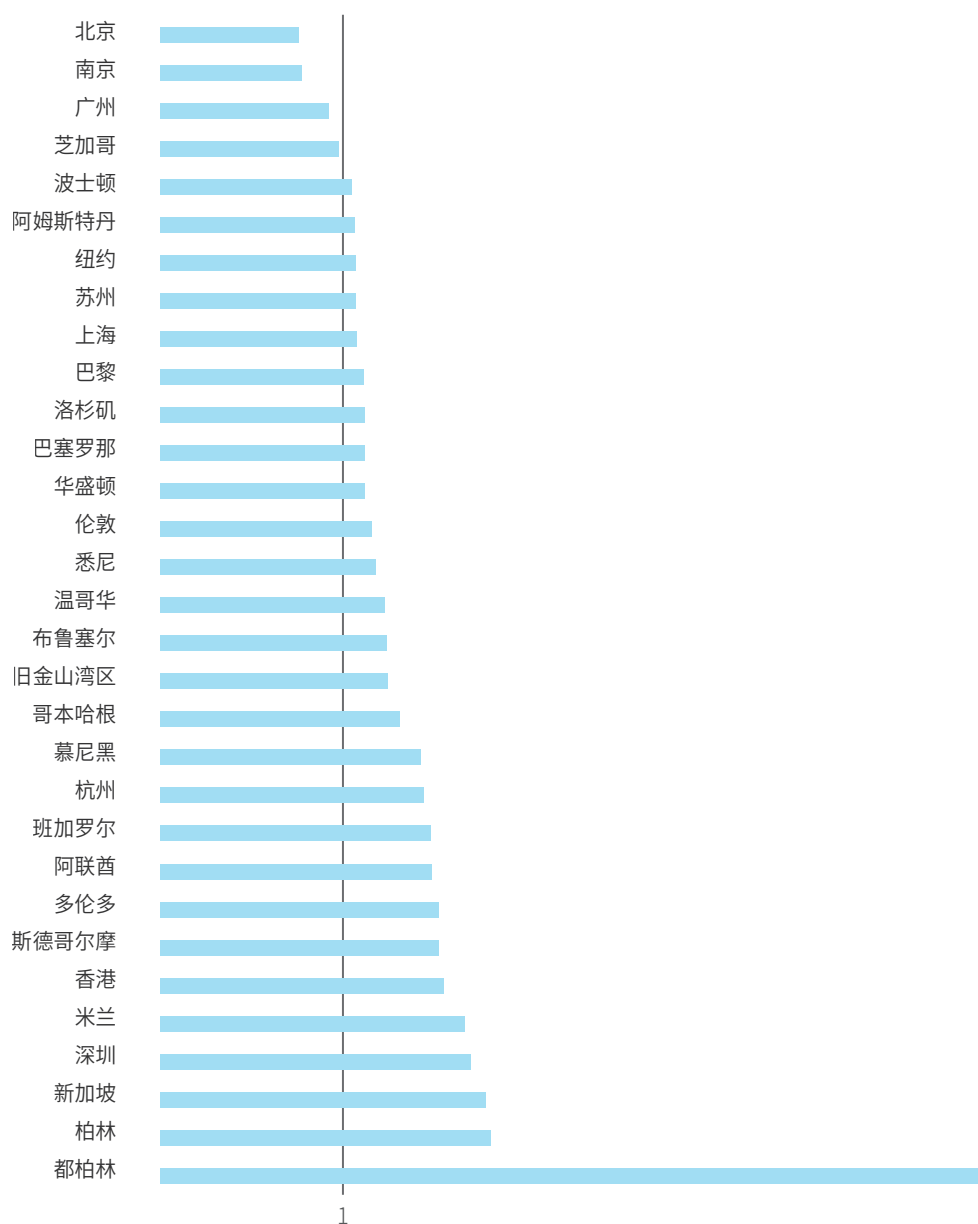


图4 全球数字人才吸引力
(注：小于1表示净流出，大于1表示净流入)



03 Migration of Digital Talent in 2019

6. From the perspective of global digital talent attraction, European and Asia Pacific cities take the lead in attracting global digital talent. Cities with the highest talent attraction are Dublin, Berlin, Singapore, Shenzhen and Milan. The top five cities with digital talent net outflow are Beijing, Nanjing, Guangzhou, Chicago and Boston. Based on the digital talent flow, Bangalore, The UAE, Singapore, SF Bay Area and New York are the global digital talent migration hubs.

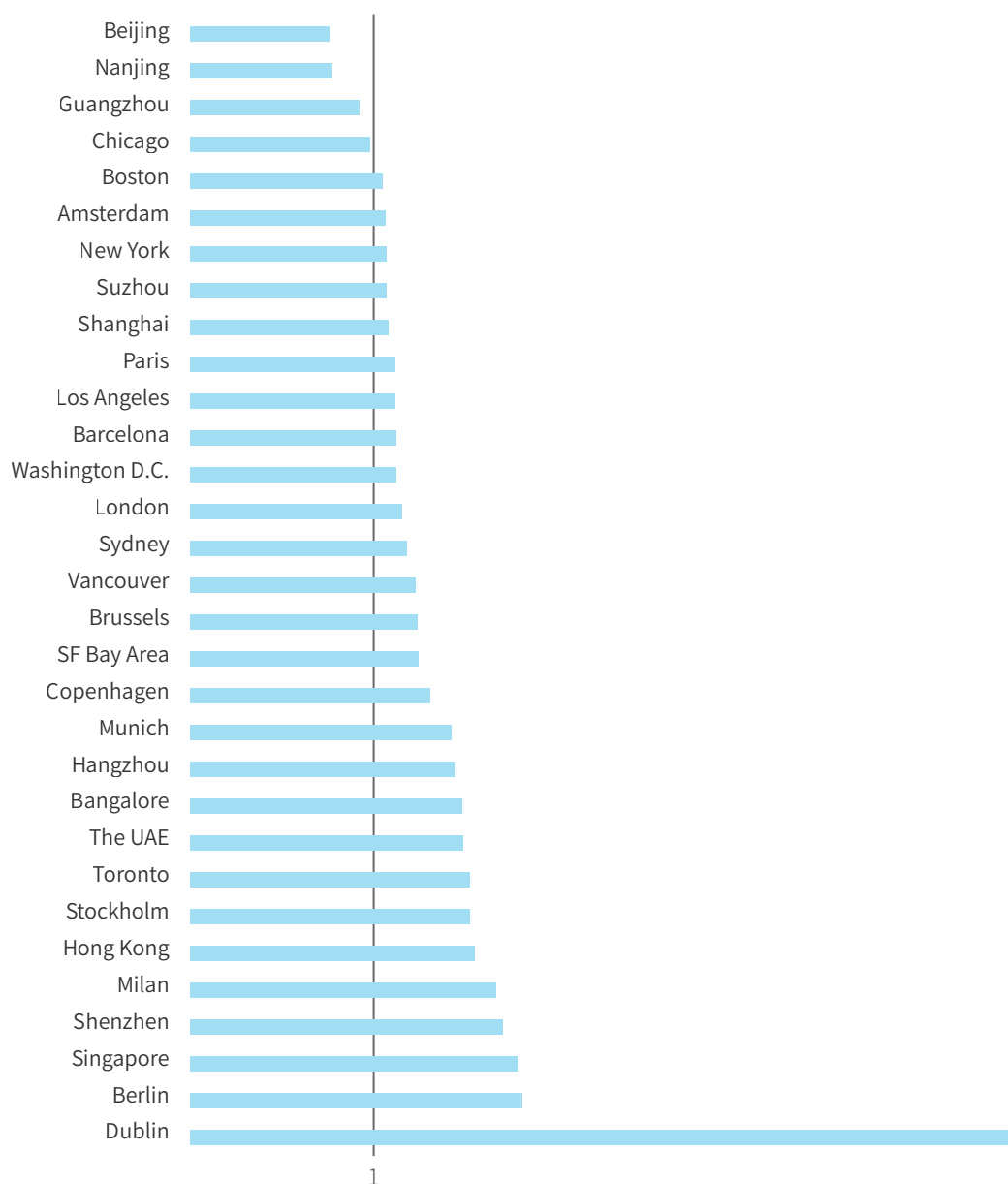


Figure 4 Attraction of global digital talent

(Note: the ratio smaller than 1 means net outflow, the ratio bigger than 1 means net inflow)

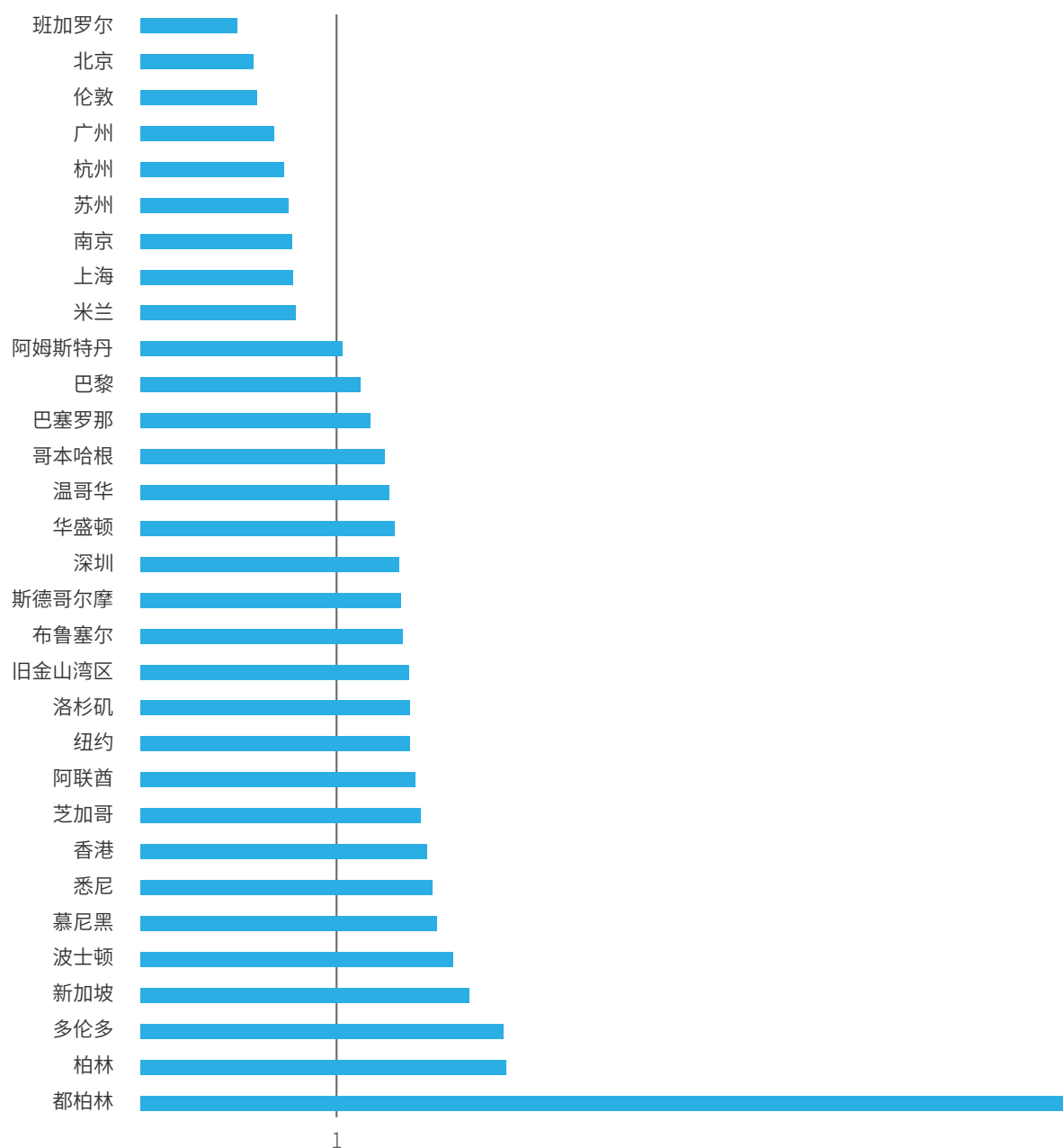


图 5 国际数字人才吸引力



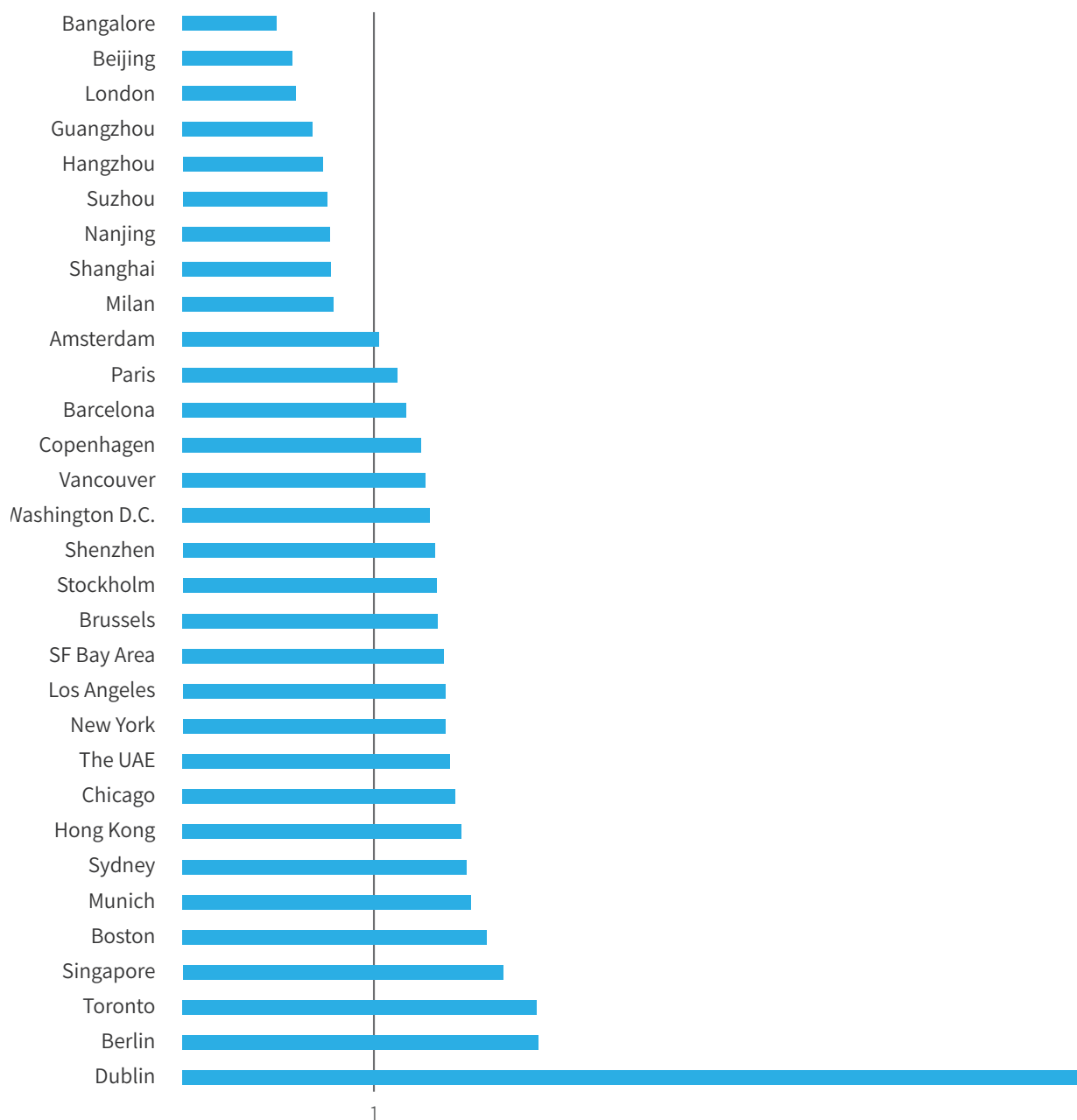


Figure 5 Attraction of International digital talents



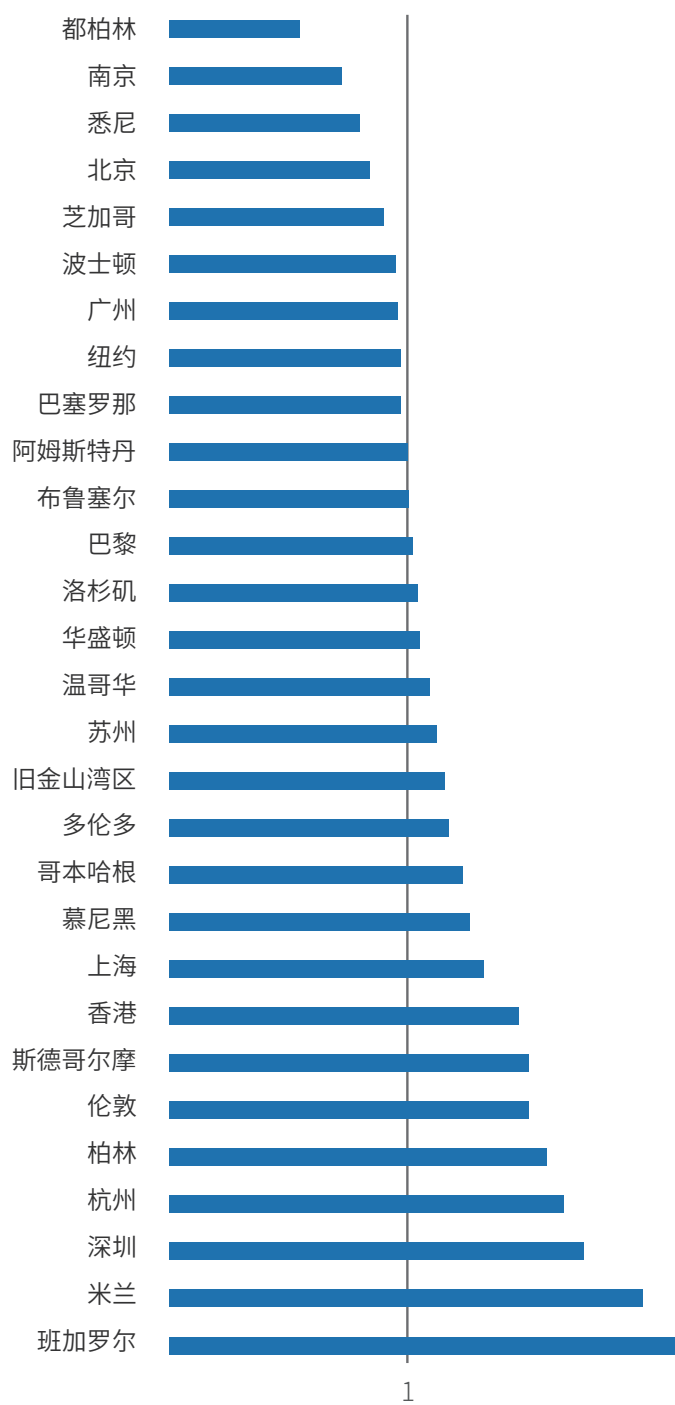


图 6 国内数字人才吸引力



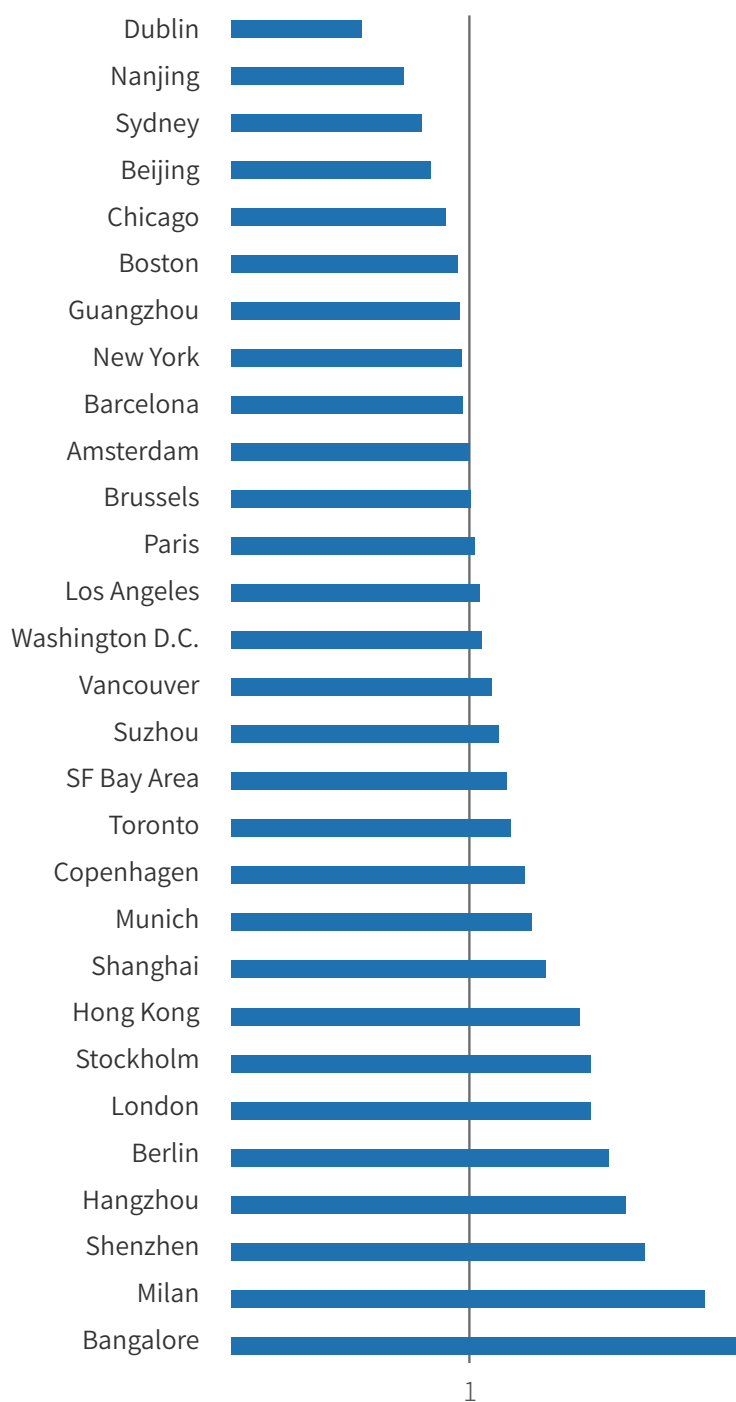


Figure 6 Attraction of Domestic digital talents



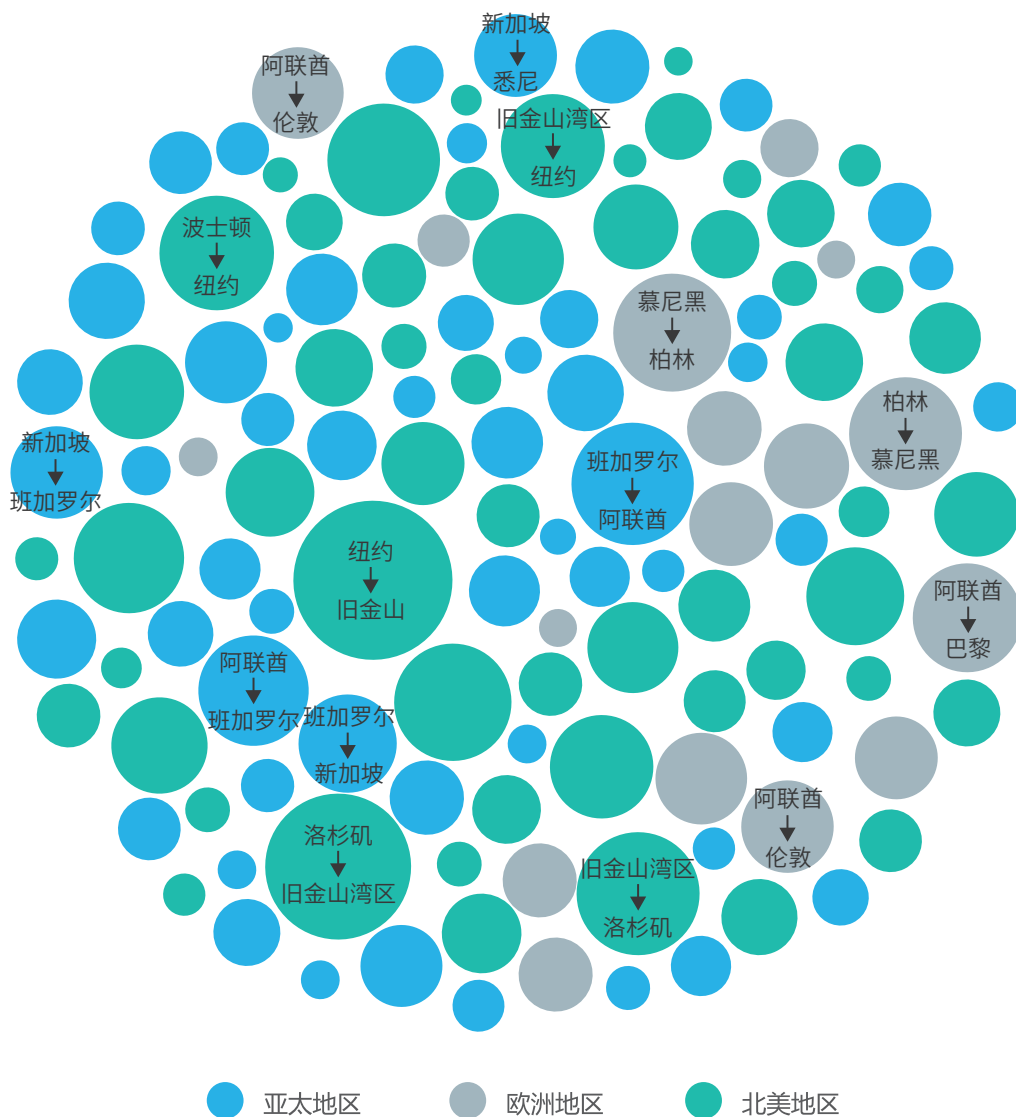


图7 数字人才在城市间的流动情况



7. 从各个区域来看，北美地区超过 87% 的数字人才在北美各城市间流动，有近 10% 的数字人才流向亚太地区，约 3% 的数字人才流向欧洲地区。欧洲地区约 36% 的数字人才在欧洲各城市之间流动，约 48% 的数字人才流向亚太地区，约 16% 的数字人才流向北美地区。亚太地区约 68% 的数字人才在亚太各城市之间流动，约 21% 的数字人才流向北美地区，约 11% 的数字人才流向欧洲。总体来看，北美和亚太地区的数字人才主要在本地区流动；北美地区和亚太地区数字人才双向流动频繁；欧洲的数字人才主要流向亚太地区。

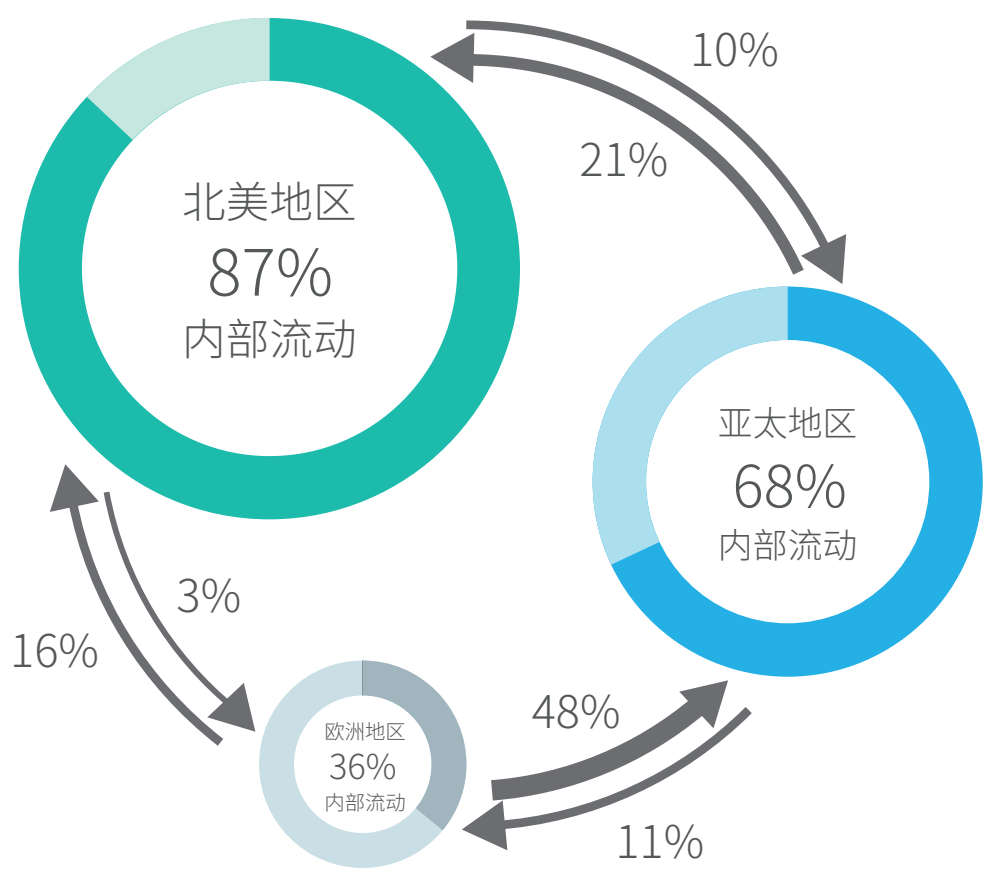


图 8 北美、欧洲和亚太地区数字人才流动



7. From intercontinental migration perspective, digital talent from North America and APAC are more locally mobile (87%), which shows that sufficient positions to retain digital talents. The two-way flow of digital talent in North America and the Asia-Pacific region is frequent; digital talent in Europe mainly flows to the Asia-Pacific region.

- More than 87% of digital talents in North America migrated between cities within North America, and nearly 10% migrated out to the Asia-Pacific Region, and about 3% to Europe.
- In Europe about 36% of digital talents migrated between European cities, about 48% migrated out to the Asia-Pacific Region, and about 16% to North America.
- In the Asia-Pacific Region about 68% of digital talents migrated between cities within the Asia-Pacific Region, with about 21% migrating out to North America and 11% to Europe.

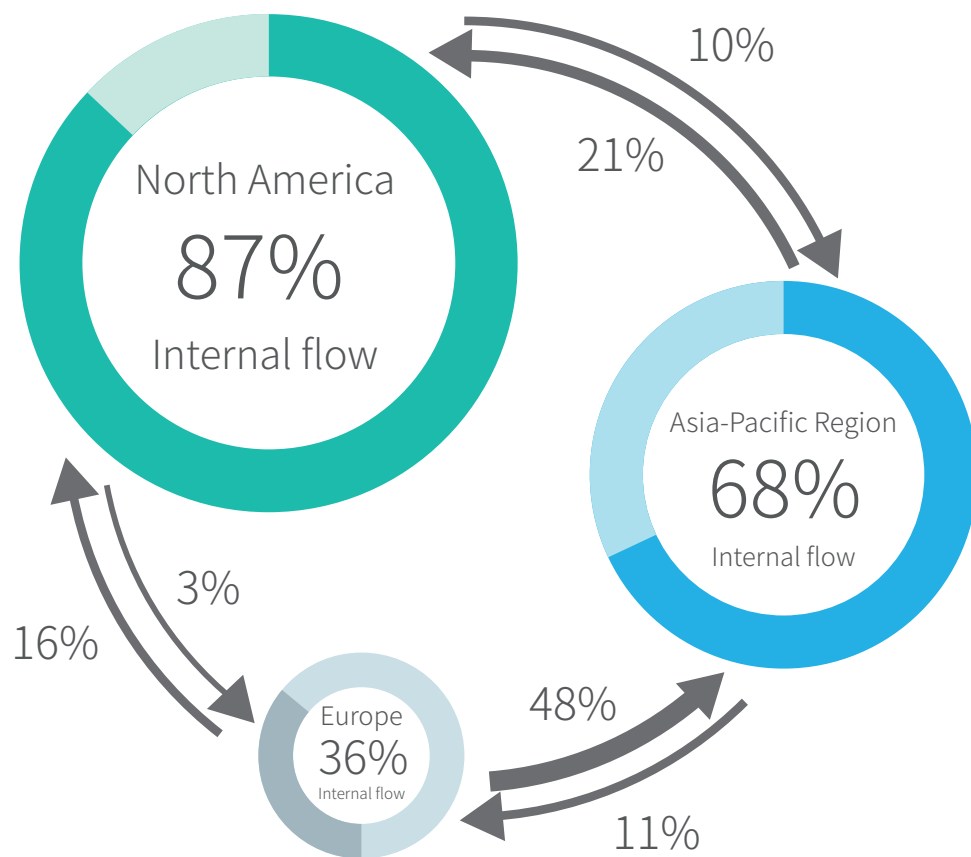
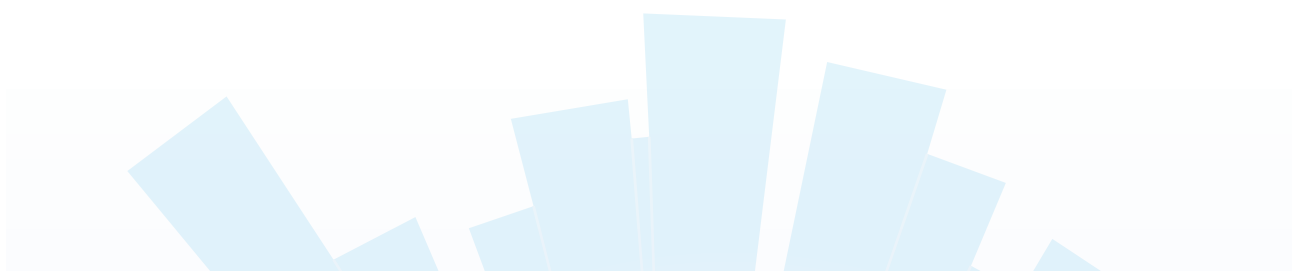


Figure 8 Digital talent flow in North America, Europe and Asia Pacific





清华大学经济管理学院互联网发展与治理研究中心

清华大学经济管理学院互联网发展与治理研究中心（Tsinghua SEM Center for Internet Development and Governance, CIDG），成立于 2016 年 4 月，是清华经管学院响应国家网络强国战略，基于学院在互联网经济与管理领域的研究、人才培养优势和国际影响力而成立的。中心以思想引领中国经济数字化转型为使命，整合全球顶级专家资源、充分利用互联网大数据等前沿科技，重点围绕数字经济、全球互联时代的商业创新、中国经济的数字化转型、互联网治理等领域展开研究工作，为提高政府科学决策水平、促进科技与商业创新和公共事业发展提供客观参考建议，为相关行业与企业提供智力支撑，同时建设促进数字经济发展与产业创新的合作平台。

如需获取关于清华大学经济管理学院互联网发展与治理研究中心的更多信息和研究资料，欢迎访问：cidg.sem.tsinghua.edu.cn，或关注我们的官方微信账号：TsinghuaCIDG。

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About Tsinghua SEM Center for Internet Development and Governance (CIDG)

Tsinghua SEM Center for Internet Development and Governance (CIDG), founded in April 2016, was established by School of Economics and Management, Tsinghua University in response to the National Strategy of Reinvigorating China through Network on the basis of the college in the research on Internet economy and management, talent training advantage, and international influence. Committed to leading the digital transformation of China's economy by thought, the center integrates the global resources of top-level experts, makes full use of cutting-edge technologies including Internet, big data, etc., carries out research work focusing on the fields of digital economy, business innovation in the era of global interconnection, digital transformation of Chinese economy, Internet governance, etc., provides objective reference suggestions for improving the scientific decision-making level of government and boosting technology and business innovation and the development of public service, and also constructs the platform for cooperation for promoting the development of digital economy and industrial innovation.

For more information and research materials on CIDG, please visit cidg.sem.tsinghua.edu.cn or find us on our official WeChat account @TsinghuaCIDG.

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领英

LinkedIn（领英）作为一家全球领先的职场社交平台，创建于 2003 年，总部位于美国硅谷。领英的愿景是为全球 30 亿劳动力中的每一位创造经济机会，进而绘制世界首个经济图谱。截止 2020 年 8 月 1 日，领英全球会员总数已超过 7.06 亿，覆盖 200 多个国家和地区，其中，中国会员总数已逾 5,100 万。领英于 2014 年正式宣布进入中国，并持续为个人会员和企业客户提供优质的本地化产品和服务。2019 年，领英经过在华五年的实践和探索之后，升级了本土化战略，正式启动中国战略 2.0。领英以社交为根基，最大化地利用全球平台和海量数据优势，让连接更有价值。同时领英携手重量级行业伙伴，打造“一站式职业发展平台”，为中国职场人在职业发展的每一个阶段提供更丰富和全面的价值，实现职业成长，始终与机会保持联系。

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Economic Graph

About LinkedIn

As the world's leading professional network, LinkedIn was founded in 2003 and is headquartered in Silicon Valley, California, USA. LinkedIn's vision is to create economic opportunity for every member of the global workforce, and create the world's first Economic Graph. As of August 1, 2020, LinkedIn has more than 706 million members from more than 200 countries and territories around the world, with the number of Chinese members currently amounting to over 51 million. In 2014, LinkedIn officially announced its entry into China and has been providing quality localized products and services to members and enterprise-level clients. In 2019, LinkedIn announced the launch of its China 2.0 strategy after five years of exploration in the country, to upgrade the previous localization strategy. Based on the unique advantage of vast global network and big data, LinkedIn joins hands with powerful industry players to build a “one-stop shop for professional and career development”, which aggregates the most demanded career-focused features to provide values to our members in various stages for career development, so as to help them make more progress and then connect to opportunities.

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